

Applicants respectfully submit that Miyanaga et al. teach the step of gettering after the heat treatment. However, the gettering step of Miyanaga is different from the step of removing the promoting material for crystallization from a surface of the semiconductor film of the presently claimed invention. Moreover, in Applicants' claimed invention, it is not necessary to getter a catalytic element. Therefore, the device manufacturing steps can be reduced.

As Miyanaga does not teach the removing of the promoting material for facilitating crystallization from a surface of the semiconductor film, but rather the gettering step, Applicants respectfully submit that Miyanaga does not positively disclose each and every step recited in claims 5-9, and 39-40. Accordingly, the §102(e) rejection is respectfully requested to be reconsidered and withdrawn.

With respect to the §102(e) rejection of claims 16-38, as amended claims 16-38 includes a step of removing the promoting material from a surface of the semiconductor film after the heat treatment without changing the shape of the semiconductor film. Applicants respectfully submit that Miyanaga does not teach the step of removing the promoting material from a surface of the semiconductor film, but rather a step of patterning a semiconductor film containing a catalyst element. As described in col. 11, lines 1-10, Miyanaga teaches that a patterning is done in order to define an active region in which source, drain and channel regions of a TFT are to be formed. Therefore, Applicants respectfully submit that the patterning step of Miyanaga is completely different from the step of removing the promoting material from a surface of the semiconductor film as claimed in claims 16-38 of the present application.

New claims 41-44 also recite the step of removing the promoting material for facilitating crystallization on the surface of the semiconductor film.

With respect to new claim 43, which recites removing the promoting material from the crystallized semiconductor film after the heat treatment, irradiating laser or intense light after removing and patterning the semiconductor film to form at least one semiconductor island, Applicants respectfully submit that claim 43 is patentable by the particular order of the recited steps, namely, the removal of the promoting material is performed between the crystallization step and the laser or intense light irradiation step.

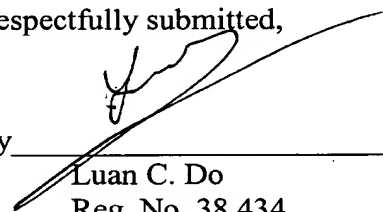
In view of the above-mentioned amendments and arguments, Applicants respectfully request withdrawal and reconsideration of the §102(e) rejections of the dependent claims.

CONCLUSION

Having responded to all rejections set forth in the outstanding Final Office Action, it is submitted that claims 5-9, 16-18, 20-22, 24-38, and 40-44 are now in condition for allowance. An early and favorable Notice of Allowance is respectfully solicited. In the event that the Examiner is of the opinion that a brief telephone or personal interview will facilitate allowance of one or more of the above claims, the Examiner is courteously requested to contact Applicants' undersigned representative.

Respectfully submitted,

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VERSION OF AMENDED CLAIMS
SHOWING CHANGES MADE

5. (Twice Amended) A method of manufacturing a semiconductor device, comprising the steps of:

forming a semiconductor film comprising amorphous silicon;

crystallizing the semiconductor film by a heat treatment while a promoting material for facilitating crystallization is retained on the semiconductor film;

removing the promoting material for facilitating crystallization [on] from a surface of the semiconductor film after the heat treatment; and

promoting crystallinity of the crystallized semiconductor film by irradiation of laser or intense light,

wherein the promoting material comprises one or more elements selected from the group consisting of group 14 elements.

7. (Amended) A method of manufacturing a semiconductor device, comprising the steps of:

applying a solution, in which a simple substance of a catalytic element for facilitating crystallization of amorphous silicon film or a compound containing the catalytic element is dissolved or dispersed, on a semiconductor film comprising amorphous silicon;

baking said semiconductor film to form a film comprising said catalytic element on said semiconductor film;

crystallizing the amorphous silicon film by carrying out a heat treatment; [and]

removing said film comprising said catalytic element from a surface of the semiconductor film after the heat treatment; and

promoting crystallinity by irradiation of laser light or intense light, wherein a kind of or plural kinds of elements selected from elements in group 14 are used as the catalytic element.

16. (Twice Amended) A method of manufacturing a semiconductor device comprising the steps of:

forming a semiconductor film comprising amorphous silicon on an insulating surface;

forming a film comprising germanium in contact with said semiconductor film by vapor phase deposition with a germanium compound gas;

heating said semiconductor film with said film comprising germanium to crystallize said semiconductor film; and

removing the film comprising germanium from a surface of said semiconductor film without changing a shape of said semiconductor film after the heating said semiconductor film.

20. (Twice Amended) A method of manufacturing a semiconductor device comprising the steps of:

forming a semiconductor film comprising amorphous silicon on an insulating surface;

forming a film comprising germanium in contact with said semiconductor film by vapor phase deposition with a germanium compound gas;

heating said semiconductor film with said film comprising germanium to crystallize said semiconductor film;

removing the film comprising germanium from a surface of said semiconductor film without changing a shape of said semiconductor film after the heating said semiconductor film;

patterning the crystallized semiconductor film into at least one semiconductor island; and

forming a thin film transistor with said semiconductor island used as at least a channel forming region thereof.

40. (Amended) A method of manufacturing a semiconductor device comprising the steps of:

forming a semiconductor film comprising amorphous silicon on an insulating surface;

forming a film comprising germanium in contact with said semiconductor film by vapor phase deposition with a germanium compound gas;

heating said semiconductor film with said film comprising germanium to crystallize said semiconductor film;

removing the film comprising germanium from a surface of said semiconductor film after the heating said semiconductor film; and

irradiating laser or intense light to said semiconductor film after the removing the film comprising germanium.